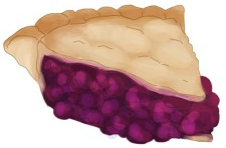
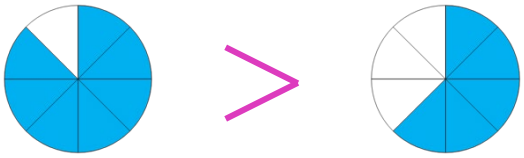
Comparing Fractions

If Maya had eaten $\frac{5}{8}$ of a pie, and Kaleb ate $\frac{3}{4}$ of a pie, how could we determine who ate more pie?



Sometimes we have to compare fractions to determine which fraction is greater than or less than the other. This is easier if both fractions have the same denominator. For example, if Maya ate $\frac{5}{8}$ of pie, and Kaleb ate $\frac{7}{8}$ of pie. We would know Kaleb ate more because 7 is bigger than 5.



When the denominators are not the same we need to make them equal before we can compare. We use the same strategy we used for equivalent fractions.

We need to make $\frac{3}{4}$ have a denominator of 8. We can multiply 4 by 2 to get 8.

Remember: whatever we do to the denominator we have to do to the numerator.

$$\frac{3\times 2}{4\times 2}=\frac{6}{8}$$

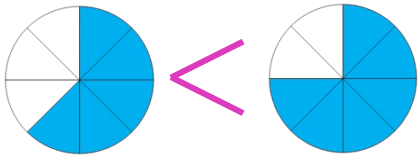
Therefore, three-fourths and six-eighths are **EQUIVALENT FRACTIONS**!

$$\frac{3}{4}=\frac{6}{8}$$

Now that both denominators are the same we can compare the numerators:

$$\frac{5}{8}<\frac{6}{8}$$

5 is smaller than 6, therefore Kaleb ate more pie than Maya!



Example 1:

Adam and Cody are both reading the Hardy Boys series of books. Adam has read $\frac{5}{7}$ of the books, and Cody has read $\frac{3}{7}$. Who has read more books?

Since both denominators are the same, these two fractions are easy to compare. We simply look at the numerator to determine which fraction is bigger. 5 is greater than 3, so Adam has read more books.

Example 2:

Which fraction is bigger $\frac{8}{12}$ or $\frac{3}{4}$?

To compare these two fractions, we need to start by making the denominator the same for both fractions. Since 4 is a factor of 12 we can make an equivalent fraction of $\frac{3}{4}$ with a denominator of 12.

$$\frac{3\times 3}{4\times 3}=\frac{9}{12}$$

Remember for equivalent fractions we have to multiply the numerator and denominator by the same number!

Now that both fractions have the same denominator we can compare the numerators. 9 is bigger than 8, therefore the fraction $\frac{3}{4}$ is bigger than $\frac{8}{12}$

$\frac{9}{12}>\frac{8}{12}$ Therefore $\frac{3}{4}>\frac{8}{12}$

Example 3:

Compare $\frac{7}{9}$ and $\frac{4}{5}$

When we have two denominators that aren't factors of one another we have to change both fractions to have the same denominator. The simplest way to do this is to multiply each fraction by the denominator of the **other** fraction.

$$\frac{4\times 9}{5\times 9}=\frac{36}{45} \quad \textbf{and} \quad \frac{7\times 5}{9\times 5}=\frac{35}{45}$$

$\frac{9}{9}$ and $\frac{5}{5}$ are both equal to 1, so multiplying by them doesn't change the value of the fraction!

We can see that $\frac{36}{45}$ is the bigger fraction because 36 is greater than 35. Therefore $\frac{4}{5}$ is the larger fraction.

$\frac{36}{45}>\frac{35}{45}$ therefore $\frac{4}{5}>\frac{7}{9}$

Example 4:

Emily bought $\frac{3}{7}$ of the items on her shopping list, Henry bought $\frac{1}{3}$ of the items on his shopping list. Who bought a greater fraction of items on their shopping list?

To start we have to rewrite each fraction with a common denominator:

$$\frac{1\times 7}{3\times 7}=\frac{7}{21} \text{ and } \frac{3\times 3}{7\times 3}=\frac{9}{21}$$

Now that both fractions have the same denominator we can see that 9 is greater than 7, therefore $\frac{3}{7}$ is the bigger fraction.

$\frac{3}{7}>\frac{1}{3}$

Therefore, Emily bought more items on her shopping list.